

CLAIMS

What is claimed is:

1. A method of making a cased wellbore comprising at least the steps of:

assembling a lower segment of a drill string comprising in sequence from top to bottom a first hollow segment of drill pipe, a latching subassembly means, a directional drilling means, and a rotary drill bit having at least one mud passage for passing drilling mud from the interior of the drill string to the outside of the drill string;

periodically halting rotary drilling, introducing into said wellbore a directional surveying means to determine the direction of the wellbore being drilled, and thereafter removing said directional surveying means from said wellbore;

rotary drilling the well into the earth in a desired direction to a predetermined depth with the drill string by attaching successive lengths of hollow drill pipes to said lower segment of the drill string and by circulating mud from the interior of the drill string to the outside of the drill string during rotary drilling so as to produce a wellbore;

after said predetermined depth is reached, pumping a latching float collar valve means down the interior of the drill string with drilling mud until it seats into place within said latching subassembly means;

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1 pumping a bottom wiper plug means down the interior of
2 the drill string with cement until the bottom wiper plug
3 means seats on the upper portion of the latching float collar
4 valve means so as to clean the mud from the interior of the
5 drill string;

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7 pumping any required additional amount of cement into
8 the wellbore by forcing it through a portion of the bottom
9 wiper plug means and through at least one mud passage of the
10 drill bit into the wellbore;

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12 pumping a top wiper plug means down the interior of the
13 drill string with water until the top wiper plug seats on the
14 upper portion of the bottom wiper plug means thereby cleaning
15 the interior of the drill string and forcing additional
16 cement into the wellbore through at least one mud passage of
17 the drill bit;

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19 allowing the cement to cure;

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21 thereby cementing into place the drill string to make a
22 cased wellbore.

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25 2. Rotary drilling apparatus to drill a borehole into the
26 earth comprising a hollow drill string possessing directional
27 drilling means comprising a jet deflection bit having at
28 least one mud passage for passing the drilling mud from
29 within the hollow drill string to the borehole, a source of
30 drilling mud, a source of cement, and at least one latching
31 float collar valve means that is pumped with the drilling mud
32 into place above the jet deflection bit to install said
33 latching float collar means within the hollow drill string

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1 above said jet deflection bit that is used to cement the
2 drill string and said jet deflection bit into the earth
3 during one pass into the formation of the drill string to
4 make a steel cased well.
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7 3. A method of directional drilling a well from the surface
8 of the earth and cementing a drill string into place within a
9 wellbore to make a cased well during one pass into formation
10 using an apparatus comprising at least a hollow drill string
11 attached to a rotary drill bit possessing directional
12 drilling means, said bit having at least one mud passage to
13 convey drilling mud from the interior of the drill string to
14 the wellbore, a source of drilling mud, a source of cement,
15 and at least one latching float collar valve assembly means,
16 using at least the following steps:
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18 pumping said latching float collar valve means from the
19 surface of the earth through the hollow drill string with
20 drilling mud so as to seat said latching float collar valve
21 means above said drill bit; and
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23 pumping cement through said seated latching float collar
24 valve means to cement the drill string and rotary drill bit
25 into place within the wellbore.
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28 4. A method for drilling and lining a wellbore comprising:
29 drilling the wellbore using a drill string, the drill string
30 having an earth removal member operatively connected thereto
31 and a casing portion for lining the wellbore; selectively
32 causing a drilling trajectory to change during the drilling;
33 and lining the wellbore with the casing portion.

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1 5. The method of Claim 4, wherein following the lining of
2 said wellbore with said casing portion, said casing portion
3 is cemented into place using at least the following steps:
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5 (a) pumping a latching float collar valve means from the
6 surface of the earth through said drill string with drilling
7 mud so as to seat said latching float collar valve means
8 above said earth removal member, whereby said earth removal
9 member possesses at least one mud passage to convey drilling
10 mud from the interior of the drill string to the wellbore;
11 and
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13 (b) pumping cement through said seated latching float
14 collar valve means to cement the drill string and earth
15 removal member into place within the wellbore.
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